

## **WHAT IS CLAIMED IS**

1. A method for thinning or eroding a gray image that preserves topological

features when the gray image is binarized comprising the step of:

subtracting a fixed value from the gray image only if a neighborhood test verifies that the thinning/erosion does not break thin features in the resulting binary image.

2. The method according to Claim 1 where the test succeeds and the subtraction is performed if the central pixel would not be converted from a foreground to a background.

3. The method according to Claim 2 where the test also succeeds and the subtraction is performed if the central pixel would be converted from a foreground to a background and either of a plurality of templates match.

4. The method according to Claim 3 where two templates are used.

5. The method according to Claim 3 where one of two 3x3 templates would match.

6. The method according to Claim 3 where one template consists of three strong background along one side and one strong foreground in the middle of the opposite side.

7. The method according to Claim 3 where one template consists of three strong background in one corner and two strong foreground in the middle of the sides of the opposite corner.

8. The method according to Claim 5 where the test is performed by comparing a 3x3 window with all four orientations of the two templates.

9. A system for thinning or eroding a gray image that preserves topological

features when the gray image is binarized comprising the step of:

means for subtracting a fixed value from the gray image only if a neighborhood test verifies that the thinning/erosion does not break thin features in the resulting binary image.

10. The system according to Claim 9 where the test succeeds and means for subtraction is performed if the central pixel would not be converted from a foreground to a background.

11. The system according to Claim 9 where the test also succeeds and the means for subtraction is performed if the central pixel would be converted from a foreground to a background and either of two templates match.

12. The system according to Claim 11 where one template consists of three strong background along one side and one strong foreground in the middle of the opposite side.

13. The system according to Claim 11 where one template consists of three strong background in one corner and two strong foreground in the middle of the sides of the opposite corner.

14. The system according to Claim 11 where the test is performed by means for comparing a 3x3 window with all four orientations of the two templates.

15. A method for thinning or eroding a gray image that preserves topological

features when the gray image is binarized comprising the step of:

subtracting a fixed value from the gray image only if a neighborhood test verifies that the thinning/erosion does not break thin features in the resulting binary image wherein the test succeeds;

subtraction is performed if the central pixel would not be converted from a foreground to a background; and

subtraction is performed if the central pixel would be converted from a foreground to a background and either of two templates match.

16. The method according to Claim 15 where one template consists of three strong background along one side and one strong foreground in the middle of the opposite side.

17. The method according to Claim 16 where one template consists of three strong background in one corner and two strong foreground in the middle of the sides of the opposite corner.

18. The method according to Claim 17 where the test is performed by comparing a 3x3 window with all four orientations of the two templates.